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Fostering Growth in Middle-Grades Teachers' Classroom Discourse Practices

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Fostering Growth in Middle-Grades Teachers' Classroom Discourse Practices

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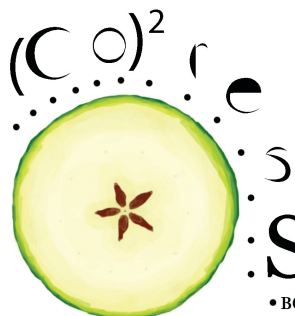
Bowling Green State Univ. Bowling Green State Univ.

Mt. Morris Schools



NOTES OF APPRECIATION AND DISCLAIMERS

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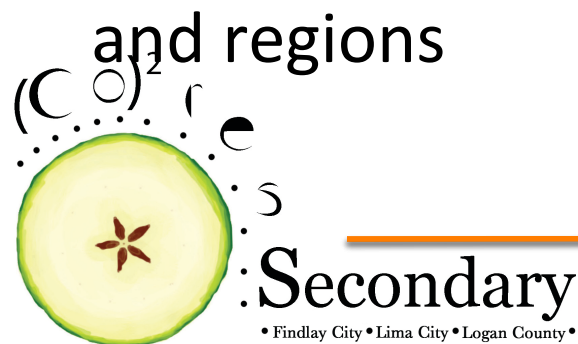
Secondary

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Ohio Board of Regents – ITQ Grant 12-07

Presentation Agenda

- Norms
- Professional Development (PD) description
- Mathematics investigation
- Data collection and analysis
- Discussion of results related to teachers' changes and attributions of success
- Open forum for synthesizing PD efforts across institutions and regions



Purpose of Presentation

- To examine changes in the classroom discourse of teachers involved in (CO)²RES Secondary PD.
- To explore the ways teachers attribute their success in making instructional changes.



Norms for our Presentation

- We will always look for another approach to solve problems.
- We will use pictures, graphs, tables, symbols, numbers, manipulatives, and/or words to assist us while doing mathematics.
- We will persist with every problem and examine it from multiple perspectives.
- We will be mathematically precise whenever possible.



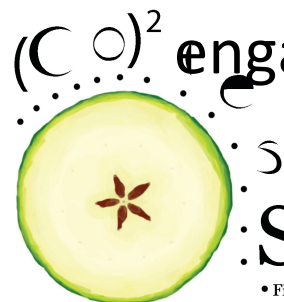
Norms for our Presentation

- Ø We will be respectful of each other's time and space and work efficiently.
- Ø We will actively participate by (a) listening to each other, (b) giving others our attention, (c) not speaking when someone else is talking, and (d) regularly sharing our ideas during the session.
- Ø If we disagree with someone or are unclear, we will ask a question about his or her idea and describe why we disagree or are confused.
- Ø We will ask questions when we do not understand something.
- Ø We will comment on others' ideas rather than the person.



Description of (CO)²RES Secondary

- Yearlong PD during February – November lasting 100 contact hours in Ohio
 - Spring: Examining the Standards for Mathematical Practice (SMPs) and reflecting on NCTM's (2007) standards for teaching and learning math (i.e., worthwhile task, learning environment, and discourse).
 - Summer: Exploring mathematics content through inquiry and connecting experiences to SMPs and NCTM standards.
 - Fall: Making instructional changes that connect with engagement in the SMPs and addressing NCTM standards

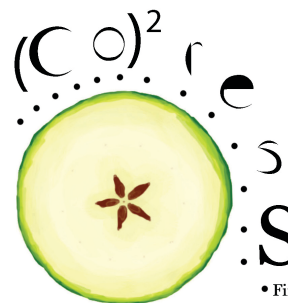


Secondary

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Quick Draw Engagement

Getting ready to draw... 3...2...1

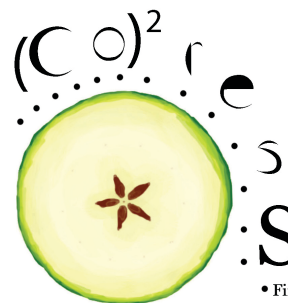
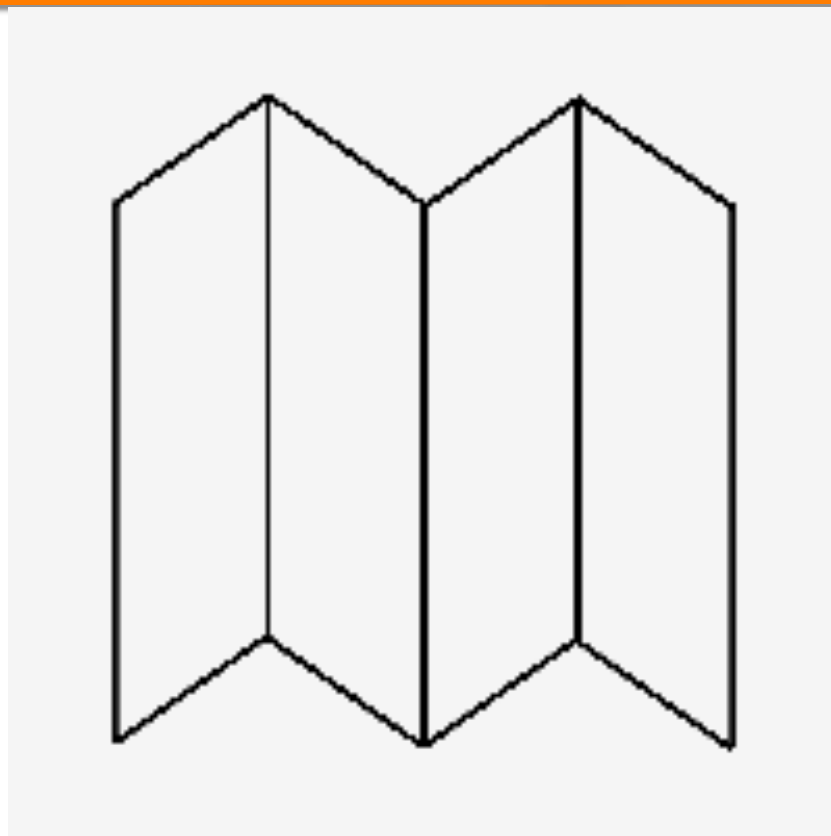


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Quick Draw Engagement



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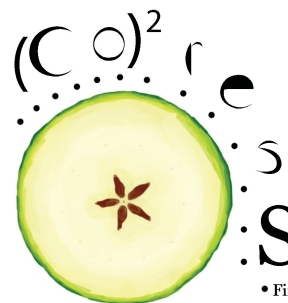
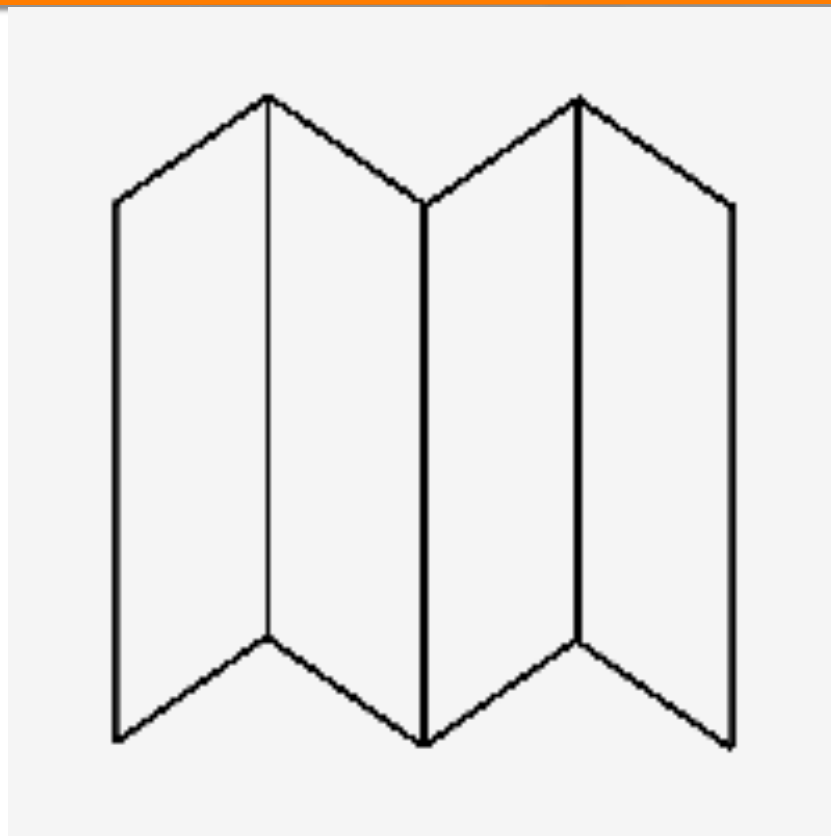
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Quick Draw Engagement

Second Chance in 3...2...1



Quick Draw Engagement



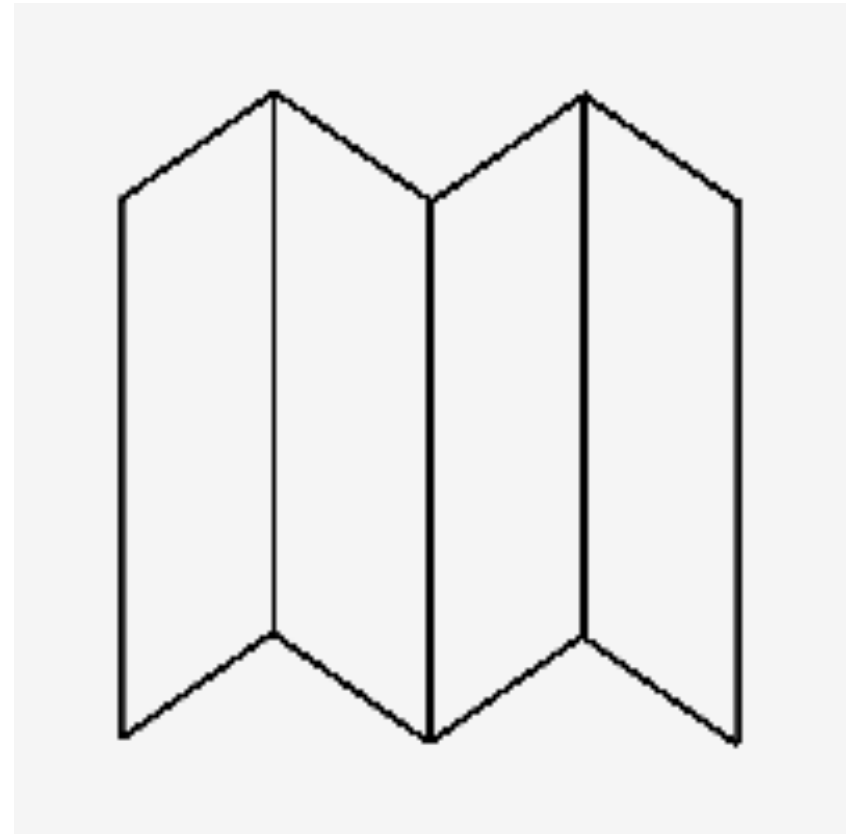
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Quick Draw Engagement

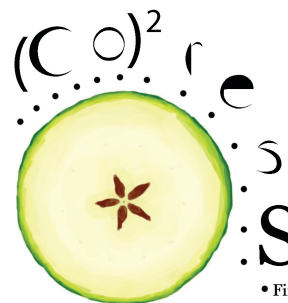
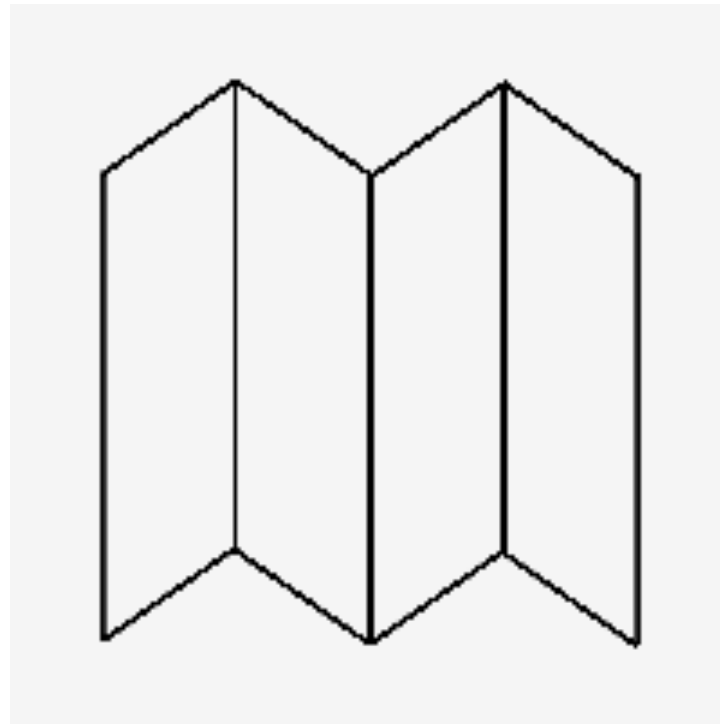
- How Did you go about drawing it?
- What did you see?
- How else can it be seen?



Quick Draw Engagement

What are the perceived mathematical benefits of Quick Draw?

What are the perceived pedagogical benefits of Quick Draw?



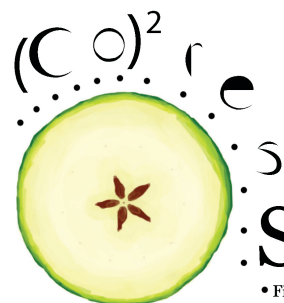
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Data Collection & Analysis

- Exploratory Sequential Design (quant -> qual) employed as means to explain quantitative results.
- Teachers submitted (a) lesson plans and (b) video of instruction with this lesson plan during Spring (after 9 hours of PD) and Fall (after 90 hours of PD).
- Focus on grades 6-8 teachers led to N = 17, which is a subset of those who participated in the PD.



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Data Analysis

- Videos of pre-PD and post-PD instruction coded using discourse protocol (Pape et al., 2010)
 - Categories: Question directionality, type of question, question complexity, and frequency of Inquire Respond Evaluate (IRE).
 - Descriptive statistics explored followed by paired-samples t-test.
- Participant interviews
 - To explore how teachers attributed instructional changes.
- Inductive analysis (Hatch, 2002) used to connect discourse patterns and attributions of success during instruction.

Video Analysis

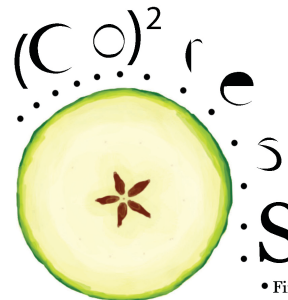
Seventh-grade teacher

- Pre-PD instruction
- Post-PD instruction

- Familiarize yourself with the provided protocol.
- Use it to code one teacher's instruction.

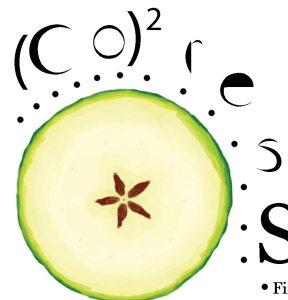
Results (Quantitative)

- Number of T-S questions decreased
($M_{pre} = 26.5, SD_{pre} = 6.3; M_{post} = 22, SD_{post} = 13$)
- Number of open-ended questions increased
($M_{pre} = 4.3, SD_{pre} = 2.8; M_{post} = 15.5, SD_{post} = 7.4$)
- Number of recitation questions decreased
($M_{pre} = 26.4, SD_{pre} = 6.9; M_{post} = 8.8, SD_{post} = 2$)
- Number of higher-level complexity questions increased
($M_{pre} = 3.9, SD_{pre} = 2.7; M_{post} = 15.7, SD_{post} = 7.3$)
- Number of IRE occurrences decreased
($M_{pre} = 6.8, SD_{pre} = 6.1; M_{post} = 1.3, SD_{post} = 1.7$)



Results (Quantitative)

- Decrease in T-S questions was not significant
 $t(16) = 1.34, p = .1$
- Increase in open-ended questions was significant
 $t(16) = 6.72, p < .001$
- Decrease in recitation questions was significant
 $t(16) = 6.99, p < .001$
- Increase in higher-level complexity questions was significant
 $t(16) = 7.21, p < .001$
- Decrease in IRE occurrences was significant
 $t(16) = 4.24, p = .001$



Results (Qualitative)

- Two impressions:
 1. Teachers attributed their classroom discourse changes to experiencing a mathematics learning environment with supportive norms, exploring mathematics through worthwhile tasks, and discussing mathematics with peers. That is, they experienced it as students and were able to reflect upon it during PD as pedagogical opportunities.



Results (Qualitative)

- Two impressions:
 2. Teachers attributed their success to the support offered by instructors and peers before, during, and after making instructional changes in the Fall (beginning of the year).

Conclusions

- PD aiming to foster teachers' instructional discourse should provide a safe place to share struggles with other teachers and PD providers.
- Also, teachers benefit from sustained PD that offers instructional support during this transition period. In short, connections between PD content and classroom instruction should be illuminated.

What's next?

- How can we, as a group of professionals, support schools to engage in sustained PD?
- What factors have teachers shared with you that seem to motivate changes in mathematics instruction, specifically focusing on discursive moves?

Thank you for coming to our session!

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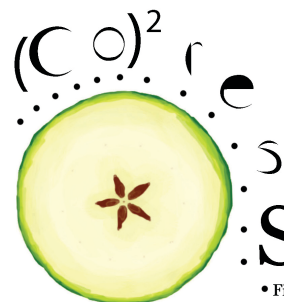
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Past and Future Related Work

- Role-playing as a tool to examine teachers' instructional practices and conceptions of Standards for Mathematical Practice (AMTE 2014)
- Investigating K-5 teachers' engagement in the SMPs (RCML 2014)
- Examining K-10 teachers' promotion of the Standards for Mathematical Practice (RCML February 2015)



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